APPENDIX A

Individual Site Descriptions and Rankings

Site #G01 Cutler Brook at Jug Handle (Farnum Rd./Rt. 44)
Glocester

Site Description: This site is located on the north side of Route 44 at the intersection with Farnum Road. Farnum Road splits and forms a "jug handle" before it merges with Route 44 and the site is within this jug handle. At nearly 600 feet in elevation, this site is truly in the upper portion of the watershed, about one mile upstream of where Cutler Brook enters Waterman Reservoir, and several miles from the River. Cutler Brook bisects the site, entering and leaving the site through culverts. The upstream culvert is surrounded by sloping pavement that directs untreated runoff directly into the brook. Upstream and downstream of the site Cutler Brook has a high degree of ecological integrity as it meanders through mature forest. As it flows through the site, however, the vegetation on both sides is cut right to the edge, and the topography grades gently and smoothly to the stream. Therefore, there is no topographic complexity and stormwater from the surrounding roads is allowed to easily reach the stream by overland flows and is not encouraged to infiltrate the soils. Most of the runoff to this section of brook is from the roads, and the surrounding land use is mostly mature forest with some agriculture and some low density residential.

Ownership	Public

Restoration Opportunities: The low-cost restoration opportunity involves stopping mowing and letting the buffer revert to an unmanaged forested riparian buffer. Plantings could be used to jump-start the reversion to forest and to prevent a dominance of exotic/invasives. The more intensive restoration approach would be to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create diverse micro-habitat.

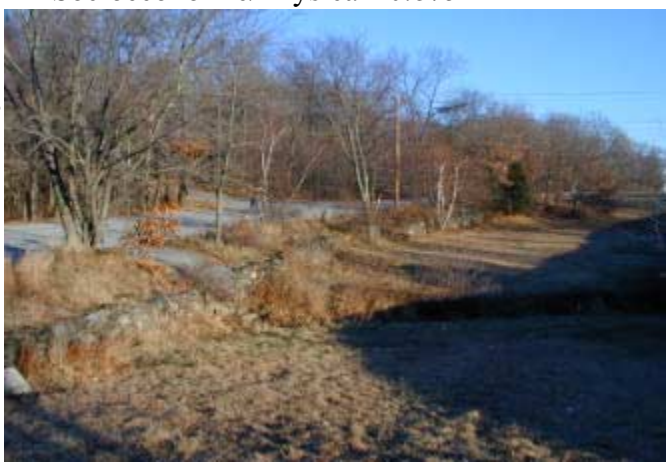
Acreage	1.00

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.750
Base Flow/Peak Flow	1.000
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.875



	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Approximately even	Moderately high
Risk of Failure	Very low	Very low

Site #G02 Glocester Country Club (Melody Hill Golf Course)
Glocester

Site Information: This site consists of a small, channelized stream that bisects the golf course and is tributary to Waterman Reservoir. This portion of the golf course is in between

Route 44 and the reservoir. As with many golf courses, the grounds are intensively managed with little natural vegetation, and lawn extends to the edge of the channel. The contributing subwatershed is mostly low to moderate density residential. The amount of filamentous and unicellular algae in the stream in the fall indicates that there is probably a nutrient loading problem with this stream section. The major potential constraint to developing the buffer zone in this area is landowner buy in. The addition of trees and shrubs to the buffer for this stream appears possible without affecting the functional aspects of this golf course and could potentially even enhance this part of the course in terms of making it more interesting/complex.

Ownership	Private

Restoration Opportunities: The low-cost restoration opportunity involves stopping mowing and letting the buffer revert to an unmanaged forested riparian buffer. Plantings would be used to jump-start the reversion to forest and to prevent a dominance of exotic/invasives. Such a forested buffer should be at least 25 feet wide but could be wider where the golf course function would not be compromised. Some sections, such as where the golf cart path crosses over the stream would remain clear. The more intensive restoration approach would be to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create diverse micro-habitat. Water quality and wildlife habitat functions could also be greatly enhanced by modifying the existing channel and re-grading the site to allow for a more natural, meandering stream channel with natural (*e.g.*, gravel) substrate and small floodplain areas.

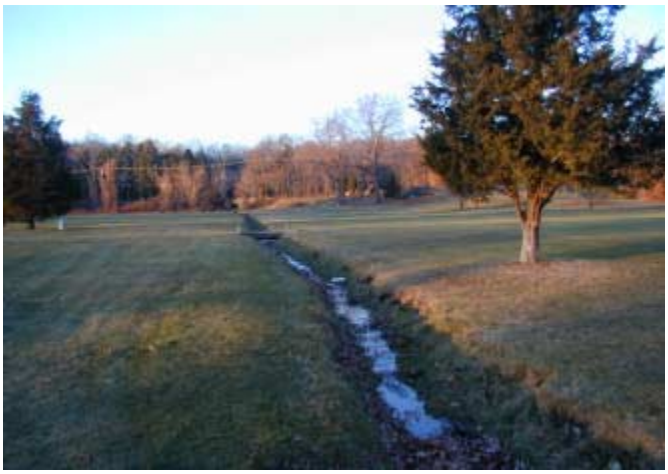
Acreage	1.25

Functional Considerations:

Water Quality	0.600
Wildlife Habitat	0.250
Base Flow/Peak Flow	1.000
Education/Aesthetics	0.250

Practical Considerations:

Socioeconomic/Physical	0.625



	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Moderately high	Moderately high
Risk of Failure	Very low	Very low

Site #J01 Easement near Putnam Pike (Rt. 44)
Johnston

Site Information: This site is a north-south oriented utility easement or right-of-way (ROW) on the west bank of the River immediately south of Route 44 and east of a series of parallel residential streets (including Swan Street) off Route 128. It is directly across the River from Centredale Manor (site #N02). The ROW is separated from the river by a very narrow (less than 10 feet) buffer situated on an abrupt/steep 3- to 4-foot bank. There are unvegetated portions of the utility easement resulting from vehicle, bike, and pedestrian traffic. No significant erosion was noted, partly because the easement is very flat. Japanese knotweed is the primary exotic/invasive species present on this site. Immediately landward (west) from the ROW there is a strip of forest on a steep hillside with some very small forested wetlands at the base of the hill next to the easement. The contributing drainage area to the west of this wooded hillside is moderate to high-density residential. The wooded hillside is able to accommodate the stormwater runoff it receives from above without significant erosion or concentrated surface flows. However, there is river flooding at the elevation of the easement according to those who nominated this site as a restoration opportunity. Such overbank flows are mostly independent of the vegetation condition on this site, and are related more to floodwater storage and de-synchronization upstream in the watershed.

Ownership Unknown

Restoration Opportunities: There is potential for some limited improvement to water quality functions to the extent that the density and species composition of the vegetation in the utility ROW is enhanced. However, the active use of the paths through this area would limit significant increases in vegetation density. There are few significant buffer enhancement opportunities on this site. The presence of the ROW, which accommodates electrical transmission lines in addition to sewer pipes, would likely preclude grading to improve stormwater management on the site.

Acreage 2.00

(continued)

Site #J01 ***Easement near Putnam Pike (Rt.44)*** *(continued)*
Johnston

Functional Considerations:

Water Quality	0.200
Wildlife Habitat	0.250
Base Flow/Peak Flow	0.000
Education/Aesthetics	0.500

Practical Considerations:

Socioeconomic/Physical	0.500

	Option #1	Option #2
Cost	Low	NA
Benefit/Cost Ratio	Very low	NA
Risk of Failure	Very low	NA

Site #J02 ***Greystone Mill Parking***
Johnston

Site Information: This industrial complex, which straddles the River on the North Providence/Johnston line, consists of a complex of industrial mill buildings and parking areas and is almost entirely impervious surface. Portions of this complex are actively used. There is an abandoned parking lot on the Johnston side of the River in the extreme northwest corner of the site. This was considered the most likely restoration opportunity and the evaluation was focused specifically on this lot. The lot extends right to the River bank, which is relatively abrupt/steep and has a narrow (5 to 10 feet) vegetated buffer. There are no mature trees on this buffer, which is dominated by shrubs and herbs. The most significant exotic/invasive species on the site is Japanese knotweed, which forms patches along portions of the riverbank. A relatively uncommon shrub, false indigo (*Amorpha fruticosa*), was observed in this narrow buffer. The parking lot is fenced off and does not appear to be actively used. All runoff from the parking lot is assumed to drain directly into the River, but since the fence was not crossed it was not determined whether this is primarily via storm drains or by sheet flow off the lot. Regardless, it is safe to assume that runoff is not adequately treated by the narrow strip of vegetation at the River bank. The site is surrounded by mostly roads and residential development to the east and west. Immediately upstream from the site is Greystone Mill Pond, where there is a fairly extensive system of wetlands. There is a ball field and playground just across Angell Street, to the north of the parking lot. The northern part of this park is another restoration opportunity (site #J03).

Ownership Private

Restoration Opportunities: The restoration opportunity is to remove the existing parking lot, add topographic complexity (to encourage infiltration, and create heterogeneous habitat), and install native buffer plantings. The restoration would also involve soil amendments and removal of Japanese knotweed. This site was identified by URI/RI DEM during a wetland restoration study (Miller and Golet, 2000) as a potential restoration site (URI Site #214) because it was thought to be fill material to the River's edge and seemed to be unused.

Acreage 1.00

(continued)

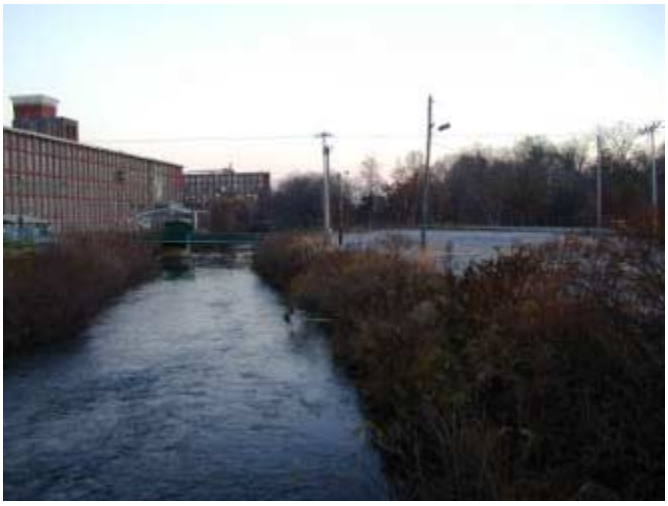
Site #J02 ***Greystone Mill Parking*** *(continued)*
Johnston

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.625



	Option #1	Option #2
Cost	NA	High
Benefit/Cost Ratio	NA	Moderately high
Risk of Failure	NA	Moderately high

Site #J03 Riverside Ave./Angell St. Ballpark and Playground
Johnston

Site Information: This site is an intensively managed (*e.g.*, mowed lawn, maintained fields) park with a ball field and playground immediately adjacent to the river. This site is immediately north of the Greystone Mill parking lot (site #J02). The northern part of the park is adjacent to the dam for Greystone Mill Pond. The spillway is concrete, and the dam is earthen. There is an approximately 50-foot length of concrete wall that retains fill at the edge of the playground and ball field. This site was identified by URI/RI DEM during their "Potential Wetland Restoration Site Study" as a possible former wetland that was filled (URI Site #16). These researchers correctly note that the existing uses and proximity to the dam and berm would likely prohibit excavation to restore the historical wetland grade and hydrology. However, there does appear to be opportunity to create a forested riparian buffer at the existing grade. A very narrow (approximately one tree width or about 5 to 10 feet wide) buffer of shrubs, small trees, and herbs separates the park from the river. Exotic/invasive species are not prevalent here. The site is surrounded by roads and residential development to the west, by the impoundment to the east and north, and by Greystone Mill to the south. Some mature forest is located immediately to the north along the west bank of the impoundment, and re-forestation efforts on this site could become contiguous with that. The topography is very flat over the entire park.

Ownership	Public

Restoration Opportunities: The low-cost restoration opportunity would be to establish a wooded riparian forested buffer by ceasing to mow/clear vegetation in the areas closest to the river (perhaps within about 50 feet), and installing native buffer plantings. A more elaborate restoration would also include grading to add topographic complexity to encourage infiltration and enhance habitat diversity.

Acreage	0.5

Functional Considerations:

Water Quality	0.600
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.000
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.875

	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Very high	Moderately high
Risk of Failure	Very low	Moderately low

Site #J04 Libutti Sand and Gravel (100 Allendale Ave.)
Johnston

Site Information: This site is an active sand and gravel pit and asphalt business on an area of glacial outwash (USDA, 1981) along the west bank of Allendale Mill Pond. There is a narrow (about 1 to 2 mature tree widths, or about 5 to 15 feet) buffer at the immediate River bank, but all remaining portions of the site lack vegetation. Exotic/invasive species along the bank include Japanese knotweed, tree-of-heaven, Norway maple, and Asiatic bittersweet. There is an extensive emergent marsh wetland in the impoundment adjacent to the site. Large mounds of sand and gravel are interspersed with buildings and equipment. Remaining areas are mostly exposed sand at grade. Because sand/gravel is highly permeable (excessively drained), it does not hold and store water the way a vegetated system with topsoil would or the way a more fine-textured soil would. Such areas can therefore be "leaky" with regard to nutrients and other pollutants, and reforestation efforts can mitigate this. The River bank is steep in places but appeared to be generally stable. The site was not accessed, but was viewed from the perimeter. We spoke with the landowner, who was not interested in devoting portions of the site to reforestation efforts.

Ownership	Private

Restoration Opportunities: The restoration opportunity would be to establish a wooded riparian forested buffer by ceasing sand and gravel mining operations in the area closest to the River (perhaps within about 50 feet). Prior to installing native buffer plantings, it would be necessary to add a layer of topsoil to the site. A more elaborate restoration would also include grading to add topographic complexity to encourage infiltration and enhance habitat diversity. This site was identified by URI/RI DEM during a wetland restoration study (Miller and Golet, 2000) as a potential restoration site (URI Site #131) due to devegetation associated with the active business.

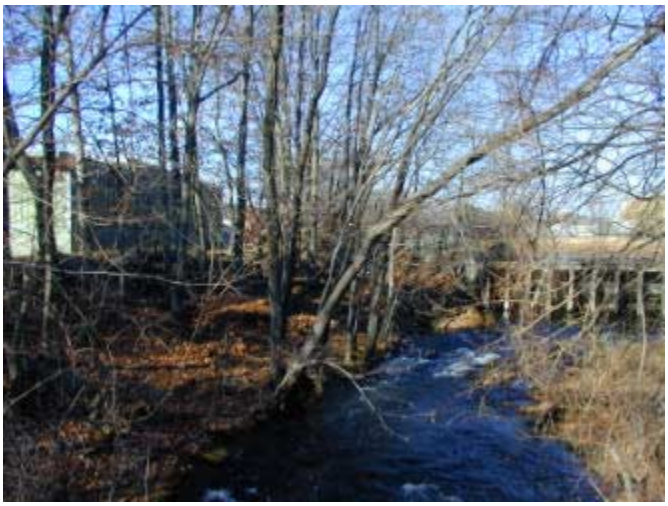
Acreage	2.50

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	1.000
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.500

Practical Considerations:

Socioeconomic/Physical	0.750



Site #J05 New England Sand and Gravel (100 Armento St.)
Johnston

Site Information: This site is an active sand and gravel pit and asphalt plant on an area of glacial outwash

	Option #1	Option #2
Cost	Low	NA
Benefit/Cost Ratio	Moderately high	NA
Risk of Failure	Very low	NA

(USDA, 1981) along the west bank of Lyman's Mill Pond. There is a narrow (about 1 to 2 mature tree widths, or about 10 to 25 feet) buffer at the immediate River bank, but most remaining portions of the site lack vegetation. Exotic/invasive species along the bank include common reed (Phragmites), and Asiatic bittersweet. There is an extensive emergent marsh wetland in the impoundment just upstream of the site. Large piles of sand, gravel, and asphalt are interspersed with buildings and equipment, including cement mixers. Remaining areas are mostly exposed sand at grade. Because sand/gravel is rapidly permeable (excessively drained), it does not hold and store water the way a vegetated system with topsoil would or the way a more fine-textured soil would. Such areas can therefore be "leaky" with regard to nutrients and other pollutants, and reforestation efforts can mitigate this. The River bank is steep in places, but appeared to be generally stable. We spoke with a manager, who indicated that one cement mixing structure and associated equipment near the river was going to be relocated in the near future.

Ownership	Private

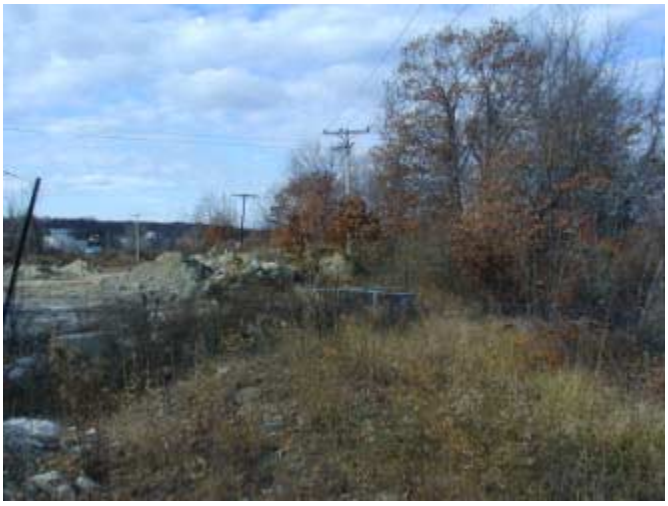
Restoration Opportunities: This area could be reclaimed as forested buffer if the landowner(s) are interested. The restoration opportunity is to establish a riparian forested buffer by ceasing sand and gravel mining operations in the area closest to the River (perhaps within about 50 feet). Prior to installing native buffer plantings, it would be necessary to add a layer of topsoil to the site. A more elaborate restoration would also include grading to add topographic complexity to encourage infiltration and enhance habitat diversity. Grading coarse-textured outwash material is typically easy/rapid as compared to other surficial materials such as tills. This site was identified by URI/RI DEM during a wetland restoration study (Miller and Golet, 2000) as a potential restoration site (URI Site #85) due to devegetation associated with the active business.

Acreage	2.50

(continued)

Site #J05 New England Sand and Gravel (100 Armento St.)
(continued)

Johnston



Functional Considerations:

Water Quality	1.000
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.250

Practical Considerations:

Socioeconomic/Physical	0.375

	Option #1	Option #2
Cost	Low	NA
Benefit/Cost Ratio	Moderately high	NA
Risk of Failure	Very low	NA

Site #J06 Johnston Auto Salvage
Johnston

Site Information: This site is an active auto salvage yard on an area of glacial outwash (USDA, 1981) along the west bank of Lyman's Mill Pond. There is a fairly wide (about 100 feet) buffer at the immediate River bank, but most remaining portions of the site lack vegetation and are covered with piles of cars or exposed and disturbed soils. A small perennial stream that is directly tributary to the River approximates the northern extent of the salvage yard. This stream is inadequately buffered in several places, including near the northeast corner of the site, where cars are piled up to the stream edge and the stream is channelized. Exotic/invasive species along the bank include Morrow's honeysuckle, Japanese knotweed, and Asiatic bittersweet. There is a relatively undisturbed wetland associated with the tributary stream between the River and the northeast corner of the site. Some portions of the yard are cleared of cars, but are also devoid of vegetation. Because the yard is located on rapidly permeable soils (coarse-textured outwash), the site is likely "leaky" with regard to nutrients and other pollutants, and reforestation efforts can mitigate this. Such soils do not hold and store water without vegetation, the way a vegetated system with topsoil would or the way a more fine-textured or less permeable soil (such as tills) would. All or part of this site could be reclaimed as forested buffer if the landowner(s) are interested. The priority should be the northern part of the yard adjacent to the tributary stream and the eastern part of the yard near the River.

Ownership	Private

Restoration Opportunities: The restoration opportunity is to establish a wooded riparian buffer. Prior to installing native buffer plantings, it would be necessary to add a layer of topsoil to the site. A more elaborate restoration would also include grading to add topographic complexity to encourage infiltration and enhance habitat diversity. Grading coarse-textured outwash material is typically easy/rapid as compared to other surficial materials such as tills. This site was identified by URI/RI DEM during a wetland restoration study (Miller and Golet, 2000) as a potential restoration site (URI Site #53) due to devegetation associated with the active business.

Acreage	3.50

(continued)

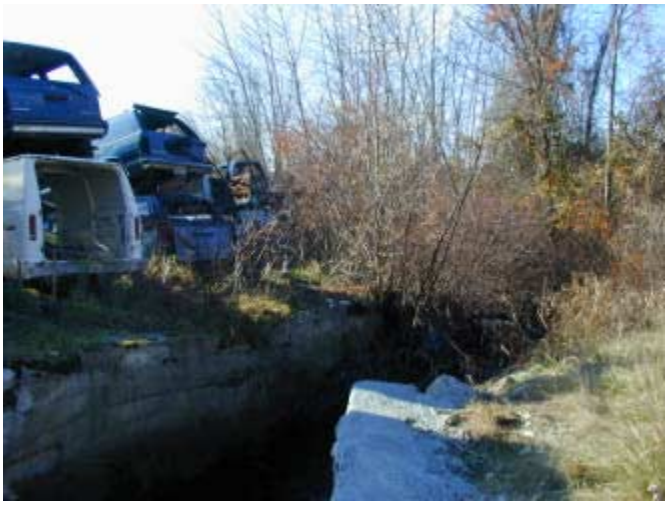
Site #J06 ***Johnston Auto Salvage*** *(continued)*
Johnston

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.250

Practical Considerations:

Socioeconomic/Physical	0.375



	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Moderately high	Moderately high
Risk of Failure	Very low	Moderately low

Site #J07 ***Pezza Sand and Gravel (100 Irons Ave.)***
Johnston

Site Information: This site is an active sand and gravel pit on an area of glacial outwash (USDA, 1981) along the west bank of Lyman's Mill Pond. There is a narrow (about 1 to 2 mature tree widths, or about 10 to 25 feet) buffer at the immediate River bank, but most remaining portions of the site lack vegetation. Exotic/invasive species along the bank include Japanese knotweed and Asiatic bittersweet. Large piles of sand and gravel are interspersed with parking areas, buildings, and equipment. Remaining areas are mostly exposed sand at grade. Because sand/gravel is rapidly permeable (excessively drained), it does not hold and store water the way a vegetated system with topsoil would or the way a more fine-textured soil would. Such areas can therefore be "leaky" with regard to nutrients and other pollutants, and reforestation efforts can mitigate this. The River bank is steep in places but appeared to be generally stable. There were some areas where erosion and sedimentation were occurring near the River bank, and there was a line of silt fence lining the River bank on a portion of the site. This site could be reclaimed as forested buffer if the landowner(s) are interested.

Ownership	Private

Restoration Opportunities: The restoration opportunity is to establish a wooded riparian buffer by ceasing sand and gravel mining operations in the area closest to the River (perhaps within about 50 feet). Prior to installing native buffer plantings, it would be necessary to add a layer of topsoil to the site. A more elaborate restoration would also include grading to add topographic complexity to encourage infiltration and enhance habitat diversity. Grading coarse-textured outwash material is typically easy/rapid as compared to other surficial materials such as tills. This site was identified by URI/RI DEM during a wetland restoration study (Miller and Golet, 2000) as a potential restoration site (URI Site #83) due to devegetation associated with the active business.

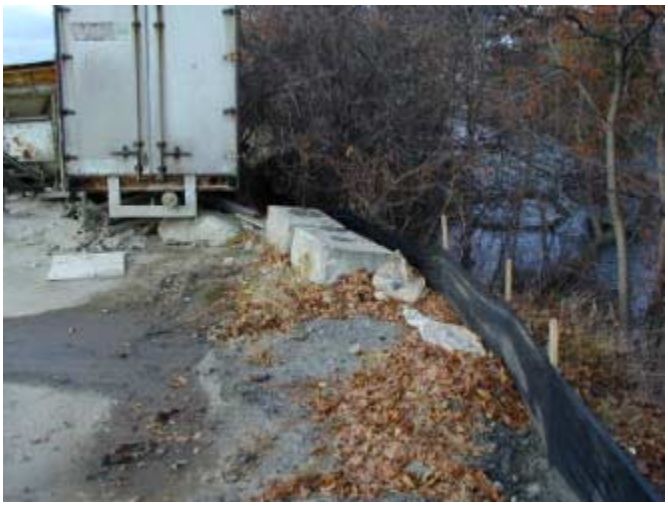
Acreage	3.25

Functional Considerations:

Water Quality	1.000
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.250

Practical Considerations:

Socioeconomic/Physical	0.375



	Option #1	Option #2
Cost	Low	NA
Benefit/Cost Ratio	Moderately high	NA
Risk of Failure	Very low	NA

Site #J08 ***Dyerville Park Golf Course***
Johnston

Site Information: This site is a recently constructed golf course in the extreme southeast corner of Johnston. There is an existing (approximately 20- to 40-foot) forested riparian buffer between the eastern edge of the golf course, the River, and the streamside wetlands and floodplains adjacent to the River. Japanese knotweed is the most significant exotic/invasive species. State ownership could increase the chances of a partnership in a restoration project, but the fact that the site was recently permitted and is nearing completion may limit willingness to devote parts of the golf course land to a riparian buffer reforestation project. Golf courses are known to potentially be the source of nutrient loading impacts to wetlands, watercourses, and waterbodies in their watershed. There are numerous practices such as use of phosphorous-free fertilizers that have recently been developed to mitigate such potential impacts. Maintaining forested riparian buffers of effective width is another means of mitigating potential nutrient/sediment input impacts from golf courses.

Ownership	Public

Restoration Opportunities: The low-cost restoration opportunity involves stopping mowing in selected sections of the eastern edge of the existing golf course grounds and letting the buffer revert to an unmanaged forested riparian buffer, subject to landowner interest. Plantings would be used to jump-start the reversion to forest and to ensure that desirable native species are favored. Ideally, a continuous buffer with a minimum width of 100 feet would be established. The more intensive restoration approach is to re-grade the buffer to enhance infiltration and accommodate stormwater runoff from the golf course. This would also create topographic complexity for habitat diversity. A vegetated infiltration basin could be installed at the base of the existing riprap drainage swale at the northern end of the park.

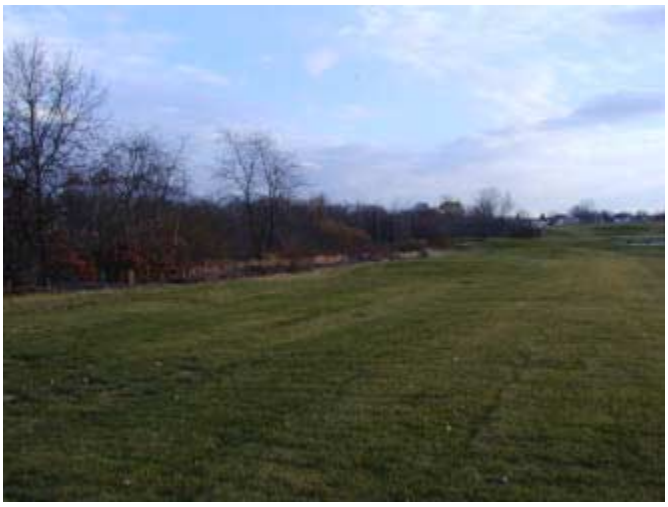
Acreage	23.25

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	1.000
Base Flow/Peak Flow	0.000
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.750



	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Moderately high	Approximately even
Risk of Failure	Very low	Very low

Site #N01 ***Allendale Mill***
North Providence

Site Information: This mill complex has been rehabilitated to residential apartments. Impervious surface (mill building and parking areas) removal was considered unrealistic due to the revitalized use of the site, so the restoration opportunity focus was on the grounds and a diversion channel associated with the old mill. The grounds consist almost entirely of lawn. The diversion channel is stagnant (little flow) and mowed lawn encroaches right to the edge where the bank is more gentle, and to within a couple feet where the bank is steep. The steep sections have a narrow band of unmanaged vegetation where the lawn mower can't access, which includes a small component of exotic/invasives (Asiatic bittersweet and tree-of-heaven) and exotic landscape plants (forsythia). Some sections consist of a vertical concrete retaining wall. The channel is directly connected to the River at the site's western property line. There is a variable-width (10 to 100 feet wide) existing wooded buffer between the lawn and the River. There is a much larger contiguous block of reference condition riparian forest (upland and wetland/floodplain) on the opposite side of the River to the west and downstream to the south. This reference condition site contains a diversity of upland and wetland/floodplain species. Surrounding the site to the east and southeast is commercial and residential development. The impoundment associated with the historical mill is to the north, and site #J04 is to the northwest. Some runoff from surrounding roads and impervious surfaces appears to enter the old mill diversion channel, as does runoff from the adjacent grounds. Nutrient loading appears to be a problem in the channel, which was thoroughly choked with large quantities of filamentous algae and unicellular algae during our October site visit. There is a sewerage line ROW bisecting the western portion of the site, but this should not preclude restoration to either side of this line.

Ownership Private

Restoration Opportunities: The low-cost restoration opportunity involves stopping mowing in selected sections of the existing lawn and letting the buffer revert to an unmanaged forested riparian buffer. Plantings would be used to jump-start the reversion to forest and to ensure that desirable native species are favored. The more intensive restoration approach is to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create diverse micro-habitat. Water quality and wildlife habitat functions could also be greatly enhanced by removing the existing channel and re-grading the site to allow for a more natural, meandering stream channel with natural substrate and small floodplain areas. Alternatively, portions of the channel could be filled to create wetland basins that would trap sediments and remove nutrients from stormwater, and discourage inadequately polished runoff from reaching the River via overland flows. This site is part of a Superfund site, which creates both potential constraints (*e.g.*, site contamination issues), and opportunities (*e.g.*, partnering).

Acreage 1.75

(continued)

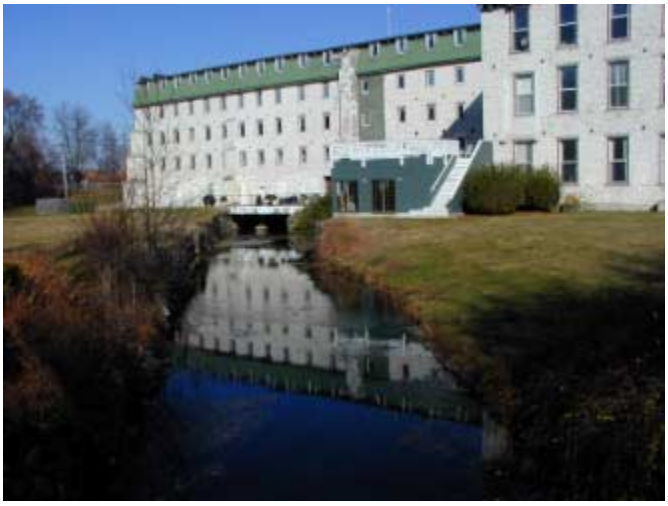
Site #N01 ***Allendale Mill*** *(continued)*
North Providence

Functional Considerations:

Water Quality	1.000
Wildlife Habitat	1.000
Base Flow/Peak Flow	0.500
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.625



	Option #1	Option #2
Cost	Low	High
Benefit/Cost Ratio	Very high	Moderately high
Risk of Failure	Very low	Moderately low

Site #N02 Centerdale Manor
North Providence (Centerdale)

Site Information: This high rise apartment complex consists of buildings, parking areas, and extensive areas of mowed lawn that encroach to the River edge with no buffer except for an occasional isolated tree. The River bank is heavily armored with riprap over nearly the entire site length at roughly a 1:1 slope. Although exotic/invasives are not present in significant numbers on the riprap or lawn, a large patch of Phragmites can be seen on the east edge of the site along what appears to be a backwater from the River.

Ownership Private

Restoration Opportunities: The low-cost restoration opportunity involves stopping mowing in selected sections of the existing lawn and letting the buffer revert to an unmanaged forested riparian buffer. Plantings would be used to jump-start the reversion to forest and to ensure that desirable native species are favored. The more intensive restoration approach is to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create diverse micro-habitat. In the existing condition the buffer is almost perfectly flat except for the riprap bank. The most intensive restoration design would, in addition to the measures above, include removal of the riprap. This would include feathering back the soils to form floodplains in places and using biostabilization to stabilize the bank. If mechanical stabilization is necessary, it should be designed to allow for dense plant growth at the River bank. Note that removing riprap and installing biostabilization measures at the foot of Centerdale Manor is impractical due to the fact that the building is almost immediately adjacent to the River, but such measures would be possible further downstream adjacent to lawn areas. This site was identified by URI/RI DEM during a wetland restoration study (Miller and Golet, 2000) as a potential restoration area (URI Sites #18, 19, and 132) due to devegetation and fill associated with the active use. The URI/DEM study observed that it is possible that some of the soils on this site could be contaminated and have been capped, based on an observation that there are huge areas of lawn on this site and some of that area appears to be fenced off. This site is part of a Superfund site, which creates both potential constraints (*e.g.*, site contamination issues), and opportunities (*e.g.*, partnering).

Acreage 4.25

(continued)

Site #N02 ***Centerdale Manor*** *(continued)*
North Providence (Centerdale)

Functional Considerations:

Water Quality	0.600
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.750

	Option #1	Option #2
Cost	Low	Very High
Benefit/Cost Ratio	Moderately high	Moderately low
Risk of Failure	Very low	Moderately high

Site #P01 ***Pleasant Valley Creek/VA Med. Center***
Providence

Site Information: This site is located immediately north of Valley Street adjacent to a gated access road to a medical center. Pleasant Valley Creek is totally channelized in this section, with concrete side-walls (approximately 2 feet high) and bed. This stream is directly tributary to the Woonasquatucket at a point about 800 feet south of Valley Street, and is piped most of this way. The buffer adjacent to the subject channelized stream section consists of closely mowed lawn with seven widely spaced mature trees (five of which are Norway maple). The topography is characterized by moderate slopes that grade smoothly to the channel with no micro-topographic complexity. The surrounding land uses include mature hardwood forest to the north and west and commercial and residential urban development (impervious surface) to the south and east. The channelized stream accommodates stormwater runoff from the surrounding watershed, much of which includes the roads, parking, roofs, and landscaped areas associated with the hospital.

Ownership	Public

Restoration Opportunities: The low-cost restoration opportunity involves stopping mowing and letting the buffer revert to an unmanaged forested riparian buffer. Plantings could be used to jump-start the reversion to forest and to prevent a dominance of Norway maple, since this exotic/invasive already dominates the woody vegetation on the site. The more intensive restoration approach would be to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create diverse micro-habitat. Water quality and wildlife habitat functions could also be greatly enhanced by removing the existing channel and re-grading the site to allow for a more natural, meandering stream channel with natural (*e.g.*, gravel) substrate and small floodplain areas.

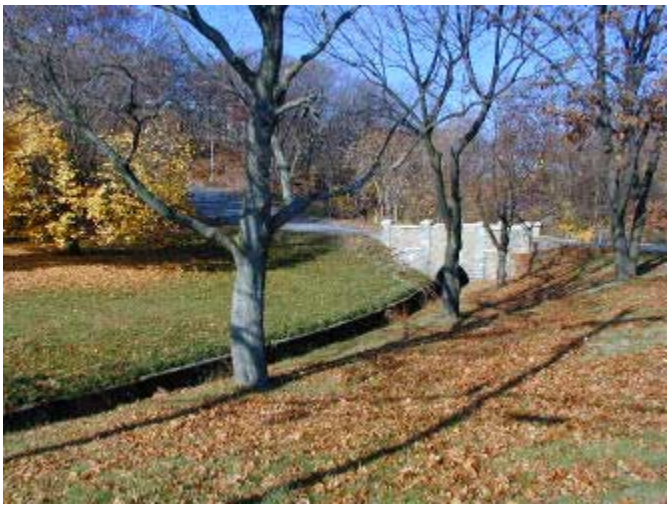
Acreage	1.00

Functional Considerations:

Water Quality	0.600
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	1.000



	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Very high	Moderately low
Risk of Failure	Very low	Moderately low

Site #P02 ***68 Hemlock St.***
Providence

Site Information: The majority of this urban lot is impervious surface (*i.e.*, parking and old industrial buildings). A vertical stone retaining wall that is unstable and beginning to fail separates the parking lot from the river. A very narrow (one tree width) wooded buffer has become established in the interstices of the retaining wall and there is a small patch of grass and weeds in the southeast corner of the site. All runoff from the impervious surfaces on this site drains directly into storm drains that discharge directly to the river without being treated by the soil/root zone of a naturally vegetated buffer. The site is bounded by the river to the south and by urban development (roads, commercial/industrial) to the north, east, and west. Exotic/invasives growing along the narrow buffer include Japanese knotweed and Norway maple. There appears to be an old storage tank beneath the parking area near the river.

Ownership	Private

Restoration Opportunities: There are no low-cost restoration opportunities. The restoration opportunity is to remove existing impervious surfaces, remove the retaining wall, feather back the soils behind the retaining wall (to re-establish a floodplain relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, create habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings. The restoration would also involve soil amendments and removal of Japanese knotweed and other exotics.

Acreage	7.00

Functional Considerations:

Water Quality	1.000
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.000
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.500

	Option #1	Option #2
Cost	NA	Very High
Benefit/Cost Ratio	NA	Very low
Risk of Failure	NA	Very high

Site #P03 ***586 Atwells Ave.***
Providence (Olneyville)

Site Information: This urban lot consists of a complex of occupied industrial buildings and parking areas and is virtually all impervious surface. A very high (more than ten feet) vertical stone retaining wall that is mostly stable separates the parking from the river. A very narrow (one tree width) wooded buffer has become established on top of the retaining wall. All runoff from the impervious surfaces on this site drains directly into storm drains that discharge directly to the river without being treated by the soil/root zone of a naturally vegetated buffer. The site is bounded by the river to the west and by urban development (roads, commercial/industrial) to the north, south, and east. Exotic/invasives growing along the narrow buffer include Japanese knotweed and Norway maple. The unusually high retaining wall is a potential constraint (in terms of cost and practicality) of establishing a buffer here. In order to achieve even a moderate slope of 4:1, the soils behind the retaining wall would need to be feathered back more than 50 feet with considerable removal of fill.

Ownership	Private

Restoration Opportunities: There are no low-cost restoration opportunities. The restoration opportunity is to remove existing impervious surfaces, remove the tall retaining wall, feather back the soils behind the retaining wall (to re-establish a closer relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, enhance habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings.

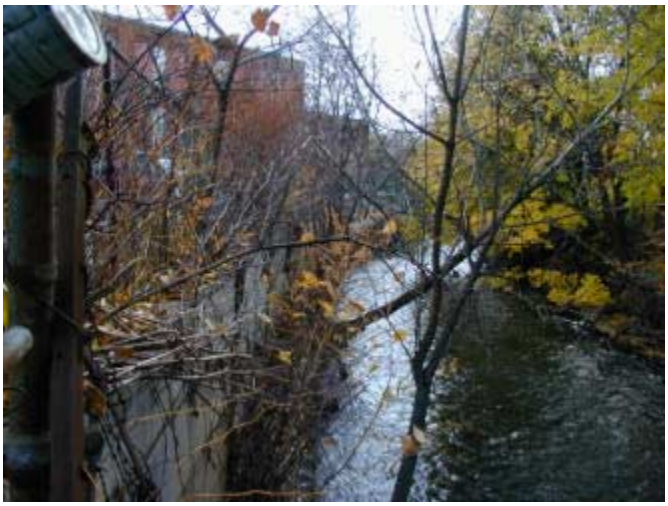
Acreage	4.00

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.500

Practical Considerations:

Socioeconomic/Physical	0.500



	Option #1	Option #2
Cost	NA	Very High
Benefit/Cost Ratio	NA	Approximately even
Risk of Failure	NA	Very high

Site #P04 ***Donigian Park/Valley St. Playground***
Providence (Olneyville)

Site Information: This site is an intensively managed (*e.g.*, mowed lawn, maintained fields, paved walkways) park immediately adjacent to the river. An approximately 4- to 5-foot-high stone retaining wall with a narrow (one tree width) wooded buffer separates the park from the river. Residential and commercial development dominate the areas to the east and north of the park. Mature forest is the dominant cover type to the west, and the southern boundary of the park coincides with the river and retaining wall. The first dam on the Woonasquatucket River (Rising Sun Dam) occurs just upstream from this site, so the river immediately adjacent to this site is subject to a small tidal influence. Trees along the retaining wall are apparently being used for educational purposes as many of them were tagged, identifying the species. The topography is very flat over the entire park to the vertical retaining wall. There is some evidence of clearing (stumps, cut limbs) adjacent to the river, perhaps to increase access or visibility, and buffer plantings could potentially be counter to existing management approaches or possibly could generate some neighborhood opposition. Tree-of-heaven is the only exotic/invasive that occurs in significant numbers; this is one of the few sites in Providence without a knotweed problem.

Ownership	Private

Restoration Opportunities: The low-cost restoration opportunity would be to establish a wider riparian forested buffer by ceasing to mow immediately adjacent to the river, installing native vegetation, and completing some minor erosion control and soil amendments near the retaining wall. A more elaborate restoration would be to remove the retaining wall, feather back the soils behind the retaining wall (to re-establish a closer relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, create habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings.

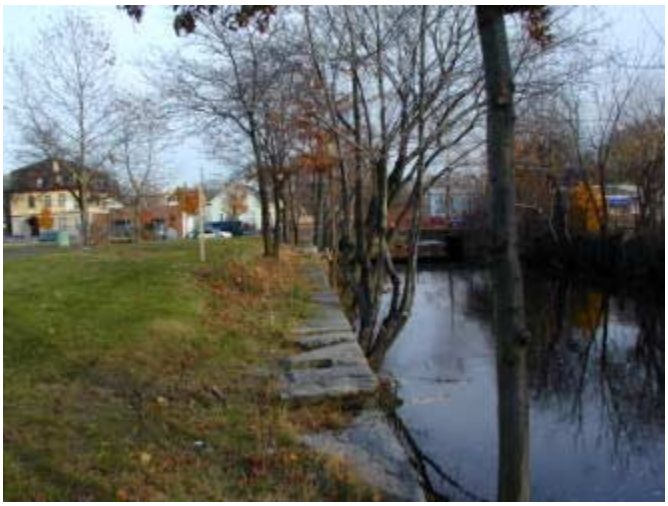
Acreage	0.25

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	1.000
Base Flow/Peak Flow	0.000
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.750



	Option #1	Option #2
Cost	Low	High
Benefit/Cost Ratio	Moderately high	Moderately high
Risk of Failure	Very low	Moderately low

Site #P05 ***190 Valley St.***
Providence (Olneyville)

Site Information: This site is an active auto garage with associated parking area. The parking area is either new or has been recently re-paved. The site is virtually all impervious surface. A narrow (about two mature tree widths or about 5 to 20 feet) wooded buffer separates the park from the river. In places, there is an approximately 4- to 5-foot-high stone retaining wall at the riverbank. The existing buffer does not appear to be wide enough or complex enough to treat stormwater runoff from the impervious surfaces on this site. The River borders the site to the north and west. Urban development (roads, dense residential, and commercial/industrial) borders the site to the south and east. Exotic/invasives growing along the narrow buffer include tree-of-heaven. The recent improvements to the site indicate that it is occupied by a viable, active business. This practical constraint could preclude the establishment of a wider, more functional buffer here.

Ownership	Private

Restoration Opportunities: There are no low-cost restoration opportunities. The restoration opportunity is to remove a portion of the existing impervious surfaces, remove the floodwall, grade the soils (to re-establish a closer relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, enhance habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings.

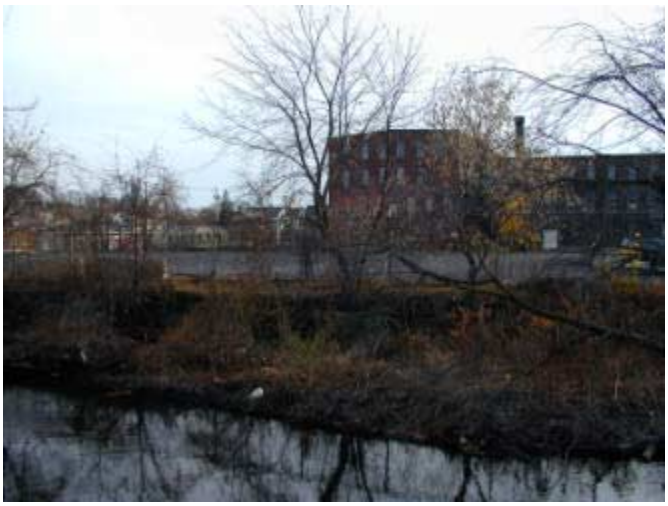
Acreage	1.50

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.500
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.500



	Option #1	Option #2
Cost	NA	Very High
Benefit/Cost Ratio	NA	Approximately even
Risk of Failure	NA	Very high

Site #P06 ***80 Manton Ave. (Shopping Center)***
Providence (Olneyville)

Site Information: This urban lot consists of active commercial buildings and associated parking and is virtually all impervious surface. A stable, vertical stone retaining wall (about 4 feet high) separates the parking lot from the river. There is a very narrow (one tree width) wooded buffer between the parking lot and the retaining wall. Runoff from the impervious surfaces on this site drains directly into storm drains that discharge directly to the River (*i.e.*, runoff does not flow through the narrow buffer). The site is bounded by the river to the south and by roads and commercial/industrial development to the north, west, and east. Exotic/invasive plants growing along the narrow buffer include Japanese knotweed and tree-of-heaven. The retaining wall is a potential constraint (in terms of cost) in that the envisioned restoration opportunity involves its removal. The existing, active commercial business at this location could preclude the establishment of a wider, more functional buffer here.

Ownership	Private

Restoration Opportunities: The restoration opportunity is to remove existing impervious surfaces, remove the retaining wall, grade the soils behind the retaining wall (to re-establish a closer relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, create habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings. The restoration would also involve soil amendments and removal of Japanese knotweed.

Acreage	1.00

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.500

	Option #1	Option #2
Cost	NA	High
Benefit/Cost Ratio	NA	Approximately even
Risk of Failure	NA	Moderately high

Site #P07 ***Merino Park***
Providence (Hartford)

Site Information: This site is an intensively managed (*e.g.*, mowed lawn, maintained fields, paved walkways) park immediately adjacent to the river. A narrow (10 to 25 feet wide) wooded buffer separates the park from the river. There is a strip of mature forest on the steep hillside to the south of the park. The immediate riverbank is devegetated in places due to human foot traffic. An asphalt slab is poured over the stream bank in one place, perhaps as a means of controlling bank erosion. The majority of the riverbank is stable. Dense residential development including housing projects dominates the area to the south and east beyond this strip of forest. The park is bounded by the River and mature forest to the west and by Route 6 to the north. The open space once occupied by Lincoln Lace and Braid (site #P13) is several hundred feet upstream from the park, beyond a wooded floodplain that separates the two sites. There is an extensive patch of Japanese knotweed within this mature floodplain forest. There is a path through the forested area between the two sites, which could provide an excellent educational and/or recreational opportunity. The topography is very flat over the entire park, but the hillside that separates the park from the surrounding residential area is very steep.

Ownership	Public

Restoration Opportunities: The low-cost restoration opportunity would be to establish a wider riparian forested buffer by ceasing to mow in the areas closest to the river, and installing native buffer plantings. A more elaborate restoration would also include stream bank stabilization over about a 30-foot long stretch of bank. One approach would be to construct a viewing deck (since foot traffic is inevitable) and do bio-stabilization along the remaining stretch. The more elaborate restoration could also include grading to add topographic complexity to encourage infiltration and enhance habitat diversity.

Acreage	2.25

Functional Considerations:

Water Quality	0.400
Wildlife Habitat	1.000
Base Flow/Peak Flow	0.000
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	1.000

	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Moderately high	Approximately even
Risk of Failure	Very low	Very low

Site #P08 Eagle St./Atwells Ave./Valley St. Brownfield
<u>Providence</u>

Site Information: This urban lot, which straddles the River, consists of a complex of industrial mill buildings and parking areas and is virtually all impervious surface. This lot is currently the subject of a potential redevelopment project, and there is therefore some opportunity to improve the riparian buffer condition on the site relative to the present as a component of this project. Vertical stone and concrete retaining walls approximately 4 to 8 feet in height line the River. Water stains on these walls reveal that the River in this location is subject to tidal fluctuation. A very narrow (one mature tree width) wooded buffer has become established on top of the retaining wall. All runoff from the impervious surfaces on this site drains directly into storm drains that discharge directly to the river without being treated by the soil/root zone of a naturally vegetated buffer. The site is surrounded by roads and dense commercial and residential development. Exotic/invasives growing along the narrow buffer include Japanese knotweed, Asiatic bittersweet, and Norway maple.

Ownership	Private

Restoration Opportunities: The restoration opportunity would be to remove existing impervious surfaces immediately adjacent to the River, remove the tall retaining wall where possible, feather back the soils behind the retaining wall (to re-establish a closer relationship between the river and the riparian buffer) where possible, add topographic complexity (to encourage infiltration and create habitat diversity), and install native buffer plantings. The restoration would also involve soil amendments and removal of Japanese knotweed and other exotic/invasives.

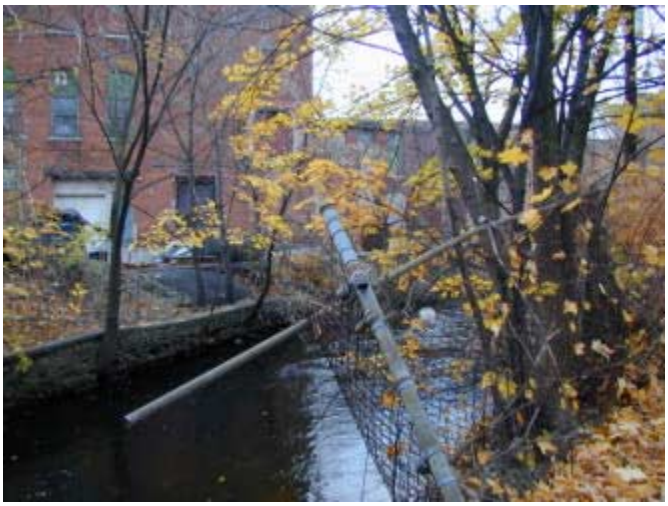
Acreage	18.00

Functional Considerations:

Water Quality	1.000
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.500
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.625



	<u>Option #1</u>	<u>Option #2</u>
Cost	High	Very High
Benefit/Cost Ratio	Approximately even	Approximately even
Risk of Failure	Very high	Very high

Site #P09 ***Olneyville Post Office Parking***
Providence (Olneyville)

Site Information: This urban lot consists of active commercial buildings and associated parking and is virtually all impervious surface. A stable, vertical retaining wall (about 4 feet high) separates the parking lot from the river. There is a very narrow (one tree width) wooded buffer between the parking lot and the retaining wall. Runoff from the impervious surfaces on this site drains directly into storm drains that discharge directly to the River (*i.e.*, runoff does not flow through the narrow buffer). The site is bounded by the river to the south and by roads and commercial/industrial development to the north, west, and east. A small area of bark mulch on the eastern corner of the site had no vegetation but may be an indication that some landscaping is planned. Exotic/invasive plants growing along the narrow buffer include Japanese knotweed and tree-of-heaven. The retaining wall is a potential constraint (in terms of cost) in that the envisioned restoration opportunity involves its removal. The existing, active parking lot at this location could preclude the establishment of a wider, more functional buffer here, unless the parking can be relocated outside of the immediate buffer zone.

Ownership	Public

Restoration Opportunities: The restoration opportunity is to remove existing impervious surfaces, remove the retaining wall, grade the soils behind the retaining wall (to re-establish a closer floodplain relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, create habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings. The restoration would also involve soil amendments and removal of exotic/invasives.

Acreage	1.00

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	1.000

	Option #1	Option #2
Cost	NA	High
Benefit/Cost Ratio	NA	Approximately even
Risk of Failure	NA	Moderately low

Site #P10 Riverside Mill (50 Aleppo St.)
Providence

Site Information: This city-owned lot is a former mill site off of Aleppo Street immediately upstream from Olneyville and downstream from Merino Park (site #P07). The existing condition features an early-successional community of plants typical of disturbed sites and abandoned urban lots. A large variety of exotic/invasive species have gained a foothold within this community, including common reed, purple loosestrife, Japanese knotweed, multiflora rose, tree-of-heaven, Norway maple, Asiatic bittersweet, Morrow's honeysuckle, mullein, and Russian olive. A diverse community of native vegetation is also present, however, including sweet pepperbush, black willow, blue vervain, and red maple at the stream margin, and several native upland grasses and forbs over the disturbed soils of the site's interior. Debris from historical uses occurs throughout the site, including concrete slabs, small piles of brick, and pieces of rusted metal. Dense residential development occupies the contributing drainage area upgradient from the site, to the north and east. There is a relatively small component of stormwater runoff from the residential area that does not enter city storm drains and which reaches the site. This runoff is able to infiltrate the soils on the site before reaching the River. No signs of concentrated surface runoff such as gullies, rivulets, or eroding soils were evident on the site. The site is almost entirely vegetated, but some areas are sparsely vegetated due to debris and sterile (*i.e.*, low organic matter) soils. There is an intact forested riparian buffer on the opposite side of the River from the site, to the south and west, that includes uplands, wetlands, and floodplains interspersed. There are also some narrow emergent and scrub-shrub wetlands along the river margin on both sides of the River.

Ownership Public

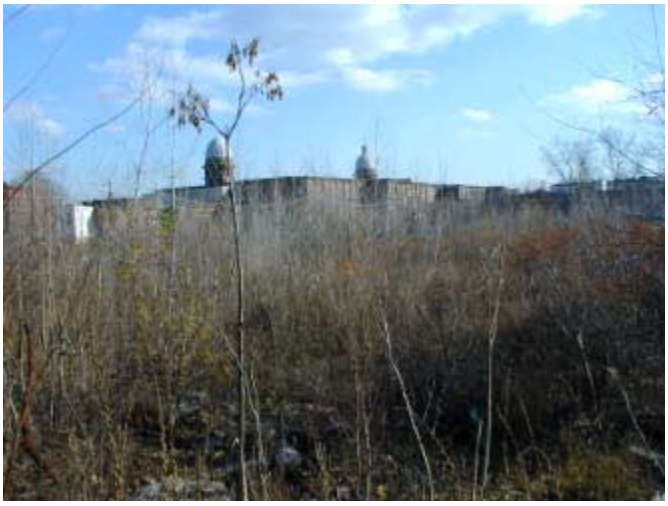
Restoration Opportunities: The low-cost restoration opportunity involves simply letting the buffer revert to an unmanaged forested riparian buffer. Plantings could be used to jump-start the succession to forest and influence the ultimate species composition. Most of the existing exotic/invasive species are shade intolerant and would ultimately be shaded out as the site became forested. Norway maple would need to be eradicated though, or it would become part of the forest canopy. Soil amendments would be necessary and debris would need to be removed. The more intensive restoration approach would be to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create habitat diversity. There are no retaining walls on the site upstream from the dam but the bank is relatively steep in places. The existing wetland at the upstream (west) end of the site is dominated by purple loosestrife at its wettest point (topographic low). It may be possible to eradicate the purple loosestrife and replace it with native wetland plantings in this location. This wetland floods about once annually as evidenced by drift lines/debris racks. There appears to be opportunity to extend this wetland elevation downstream (east) to increase flood storage and wetland/floodplain habitat.

Acreage 6.75

(continued)

Site #P10 ***Riverside Mill (50 Aleppo St.)*** *(continued)*
Providence

Functional Considerations:



Water Quality	0.600
Wildlife Habitat	1.000
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	1.0

	Option #1	Option #2
Cost	Low	High
Benefit/Cost Ratio	Approximately even	Approximately even
Risk of Failure	Moderately low	Moderately high

Site #P11 120 Aleppo St.
Providence

Site Information: This site is immediately upstream from Riverside Mill (site #P10). There is an existing intact wooded buffer along the River in this location that is more than 100 feet wide in most locations. This wooded buffer is one of the best reference sites in the Providence section of the River between the Providence River and Merino Park. There are no impervious surfaces on the site. The area between Aleppo Street and the existing forested buffer consists of early successional vegetation typical of disturbed sites, indicating that historical uses of this parcel have been abandoned. Like Riverside Mill, several exotic/invasive species are interspersed with native species. There is a pedestrian bridge at the site's western boundary that crosses the River and Route 6. This bridge connects to Merino Park, which in turn is connected to Lincoln Lace and Braid (site #P13). An opportunity therefore exists to create a continuous trail through restored forested riparian buffers on both sides of the River. Dense residential and commercial development occupies the contributing drainage area upgradient from the site, to the north and east. As with the Riverside Mill site, there is a relatively small component of stormwater runoff from the residential area that does not enter city storm drains and which reaches the site. This runoff is able to infiltrate the soils on the site before reaching the River. No signs of concentrated surface runoff such as gullies, rivulets, or eroding soils were evident on the site. The site is almost entirely vegetated, but some areas are sparsely vegetated due to debris and sterile (*i.e.*, low organic matter) soils.

Ownership Private

Restoration Opportunities: The low-cost restoration opportunity involves simply letting the non-forested portion of the buffer revert to unmanaged forest. Plantings could be used to jump-start the succession to forest and influence the ultimate species composition. Most of the existing exotic/invasive species are shade intolerant and would ultimately be shaded out as the site became forested. Norway maple would need to be eradicated though or it would become part of the forest canopy. Soil amendments would be necessary in places and debris would need to be removed. The more intensive restoration approach would be to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create micro-habitat. This site differs from most of the other sites in that the restoration opportunity is set back from the River by greater than 100 feet. Buffer restoration here would create an unusually large block of forest for the Providence area that would enhance wildlife habitat, especially for forest interior bird species. However, restoration of this site would result in less gain, relative to other sites, from a water quality perspective since it already has an intact buffer.

Acreage 2.50

(continued)

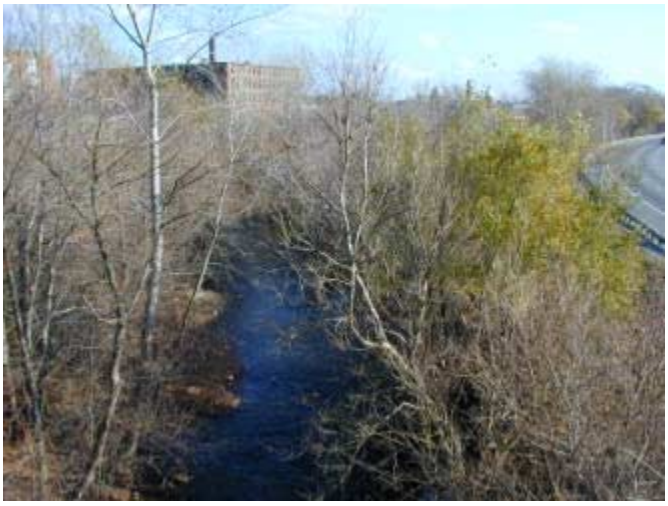
Site #P11 ***120 Aleppo St.*** *(continued)*
Providence

Functional Considerations:

Water Quality	0.200
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.000
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.750



	Option #1	Option #2
Cost	Flexible	Low
Benefit/Cost Ratio	Moderately low	Moderately low
Risk of Failure	Very low	Very low

Site #P12 ***Atlantic Mills (Manton Ave.)***
Providence

Site Information: Virtually all of this actively used industrial lot is impervious surface (*i.e.*, parking and old industrial buildings). There is a vertical stone retaining wall at the river margin. A very narrow (one tree width) wooded buffer has become established in the interstices of the retaining wall. All runoff from the impervious surfaces on this site appears to drain directly into storm drains that discharge directly to the River without being treated by the soil/root zone of a naturally vegetated buffer. The site straddles the River. Upstream to the northwest of the site, the riparian area lacks impervious surfaces and is either forested (including site #P14, which is just upstream on the west bank), or undergoing disturbed site succession (including the Riverside Mill site, just upstream on the east side of the river). Route 6 and commercial and residential development surround the site in all other directions. Exotic/invasives growing along the narrow buffer include Japanese knotweed and Norway maple.

Ownership Private

Restoration Opportunities: There are no low-cost restoration opportunities. The restoration opportunity is to remove existing impervious surfaces, remove the retaining wall, feather back the soils behind the retaining wall (to re-establish a floodplain relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, create habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings. The restoration would also involve soil amendments and removal of Japanese knotweed and other exotics.

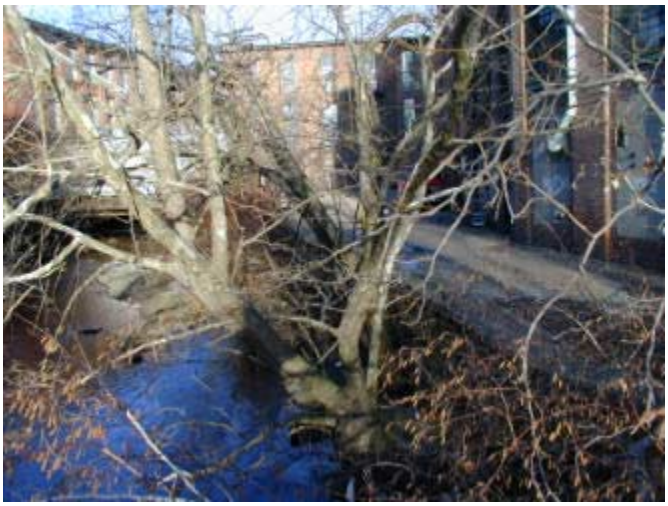
Acreage 13.50

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.500



	Option #1	Option #2
Cost	Moderate	Very High
Benefit/Cost Ratio	Approximately even	Approximately even
Risk of Failure	Moderately high	Very high

Site #P13 Lincoln Lace and Braid Brownfield (near Merino Park)
Providence (Hartford)

Site Information: This is a former industrial site just upstream from Merino Park. The above-ground structures were removed in the very recent past. However, large concrete slabs, piles of gravel, and broken pavement still remain over the approximately 3 acres of open (non-forested) land. The existing condition features an early-successional community of plants typical of disturbed sites and abandoned urban lots. A few exotic/invasive species have gained a foothold within this community, including common reed, Japanese knotweed, tree-of-heaven, Norway maple, and mullein. A block of mature forest including both upland and wetland habitat types borders the site to the east and separates the site from Merino Park. There are also small (a few acres or less) blocks of contiguous riparian forest immediately to the west of the site and across the River to the north. As such, reforestation of the subject lot would create a significant contiguous block of riparian forest that would be large enough to provide habitat for interior bird species and other wildlife species that are sensitive to fragmentation, such as many herptiles. A diverse community of native vegetation is present in the wooded areas adjacent to this site, which would help in terms of a seed source for future re-vegetation. There is a section of vertical retaining wall along a large section of the River bank, which is as much as 8 feet tall. There is a densely populated residential and commercial area (subsection known as Hartford) to the south and southwest of the site. No signs of concentrated surface runoff such as gullies, rivulets, or eroding soils were evident on the site, but some degree of overland flows and shallow subsurface runoff from the developed contributing area can be assumed to be accommodated by the site. This runoff is able to infiltrate the soils on the site before reaching the River. The site is almost entirely vegetated, but some areas are sparsely vegetated due to debris and sterile (*i.e.*, low organic matter) soils. There is a bypass reach that flows around the south side of the site and re-enters the river near Merino Park.

Ownership Private

Restoration Opportunities: The low-cost restoration opportunity involves simply letting the buffer revert to an unmanaged forested riparian buffer. Plantings could be used to jump-start the succession to forest and influence the ultimate species composition. Most of the existing exotic/invasive species are shade intolerant and would ultimately be shaded out as the site became forested. Soil amendments would be necessary in places and debris would need to be removed. The more intensive restoration approach would be to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create micro-habitat diversity. The steep retaining wall could be removed, and the bank could be feathered back in some areas to create a more natural link between the River and the buffer, such as grading to allow forested floodplain to develop. Biostabilization measures and, if necessary, some structural components, would be used at the immediate bank. The close proximity to this site of housing projects and high-density residential areas increases the potential benefits in education and aesthetic buffer functions from a riparian buffer development project. The bypass reach could be used for wetland restoration since wetland hydrology is already present. This site is part of a former Superfund site, which creates both potential constraints (*e.g.*, site contamination issues), and opportunities (*e.g.*, partnering).

Acreage 4.75

(continued)

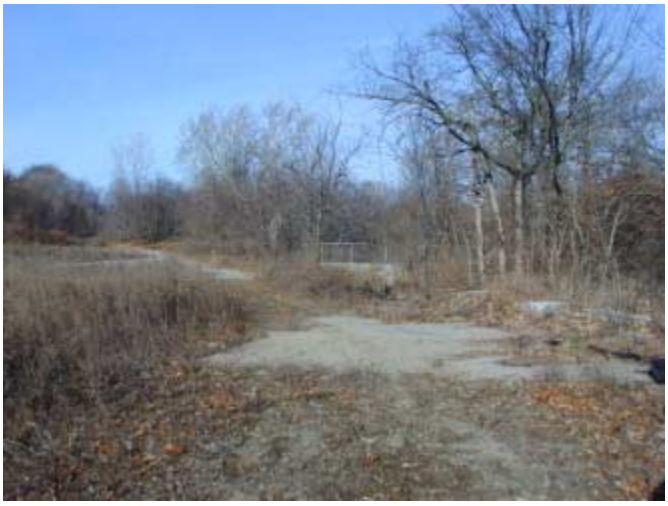
Site #P13 ***Lincoln Lace and Braid Brownfield (near Merino Park)*** *(continued)*
Providence (Hartford)

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	1.000
Base Flow/Peak Flow	0.500
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.875



	Option #1	Option #2
Cost	Moderate	High
Benefit/Cost Ratio	Very high	Very high
Risk of Failure	Moderately high	Moderately high

Site #P14 ***Hartford Ave./Rt. 6 DOT Site***
Providence (Olneyville)

Site Information: This parcel of land is wedged between the River, Route 6, and Hartford Avenue, and is owned by the DOT. It is thoroughly vegetated with young hardwood forest along a moderately steep hillside that grades from Route 6 down to the River. No unstable soils or erosion were observed in the buffer. There was a large amount of trash that could be cleaned up. There is a dam at the downstream end of the parcel, and a relatively extensive system of emergent wetlands has developed in and adjacent to the impoundment. There is only a minor problem with exotic/invasives at this site.

Ownership	Public

Restoration Opportunities: Since there are relatively steep slopes in this narrow parcel of land, and since it is already entirely vegetated, it does not make sense to conduct any restoration that involves grading work. Although the vegetation community could be slightly improved, the benefit/cost ratio of doing so would be very small. Also, the site is not very accessible, and it is not highly visible from Route 6 because it is downslope. All in all, this is not one of the better restoration opportunities evaluated, although it could benefit from a trash clean-up effort.

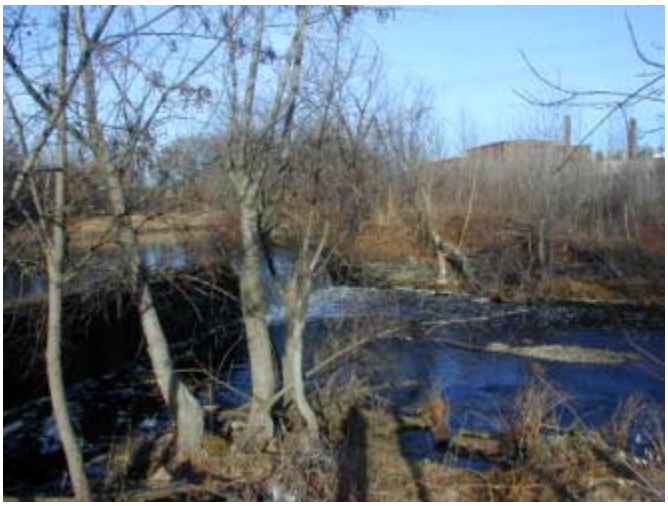
Acreage	2.25

Functional Considerations:

Water Quality	0.200
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.000
Education/Aesthetics	0.500

Practical Considerations:

Socioeconomic/Physical	0.750



	Option #1	Option #2
Cost	Low	NA
Benefit/Cost Ratio	Very low	NA
Risk of Failure	Moderately low	NA

Site #P15 ***Mancini Dr. Tributary***
Providence (Hartford)

Site Information: This site is a tributary stream that parallels Mancini Drive at the southern end of Dyerville State Park. It enters the site via a large (approximately 4-foot-diameter) concrete culvert. Portions of the streambank (near the culvert) are paved, presumably for stability. The buffer on the south side of the tributary stream is very steep and is relatively well vegetated with young hardwood forest. There is a relatively large wooded parcel on the north side, separating the golf course and the stream. A large patch of Japanese knotweed can be seen in a clearing within this forest. The water entering the site from the culvert was discolored and had a foul odor (the source of which was not known). There is a large amount of trash on this site, including huge quantities of small items and some larger items such as a car that is half in the stream channel. No unstable soils or erosion were observed in the buffer.

Ownership	Public

Restoration Opportunities: Since there are very steep slopes in the narrow parcel of land between the stream and the road, and since it is already entirely vegetated, it does not make sense to conduct any restoration that involves grading work. Although the vegetation community could be slightly improved, the benefit/cost ratio of doing so would be very small. Also, the site is not very accessible, and it is not highly visible because it is downslope. All in all, this is not one of the better restoration opportunities evaluated, although it could benefit from a trash clean-up effort. Removal of the black-top on the south stream bank and implementation of a biostabilization measure such as willow wattles would improve the function of the site somewhat. However, since the site is not visible, and since black-top is not a threat to water quality, it makes more sense to let it gradually crumble away and be covered as woody vegetation such as willow naturally penetrates its fractures.

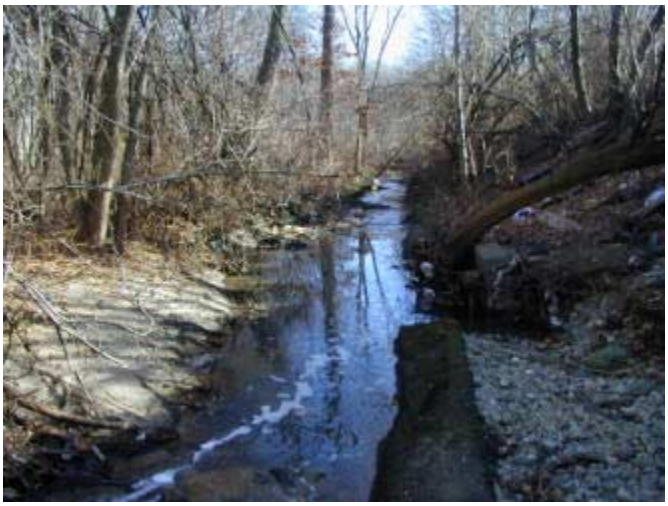
Acreage	2.75

Functional Considerations:

Water Quality	0.400
Wildlife Habitat	1.000
Base Flow/Peak Flow	0.000
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.375



	Option #1	Option #2
Cost	NA	High
Benefit/Cost Ratio	NA	Moderately low
Risk of Failure	NA	Moderately high

Site #P16 411 Valley St.
Providence

Site Information: The majority of this urban lot is impervious surface (*i.e.*, parking and old industrial buildings). A vertical stone retaining wall that is unstable and beginning to fail separates the parking lot from the river. A very narrow (one tree width) wooded buffer has become established in the interstices of the retaining wall and there is a small patch of grass and weeds in the southeast corner of the site. All runoff from the impervious surfaces on this site drains directly into storm drains that discharge directly to the river without being treated by the soil/root zone of a naturally vegetated buffer. The site is bounded by the river to the south and by urban development (roads, commercial/industrial) to the north, east, and west. Exotic/invasives growing along the narrow buffer include Japanese knotweed and Norway maple. There appears to be an old storage tank beneath the parking area near the river.

Ownership	Private

Restoration Opportunities: There are no low-cost restoration opportunities. The restoration opportunity is to remove existing impervious surfaces, remove the retaining wall, feather back the soils behind the retaining wall (to re-establish a floodplain relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, create habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings. The restoration would also involve soil amendments and removal of Japanese knotweed and other exotics.

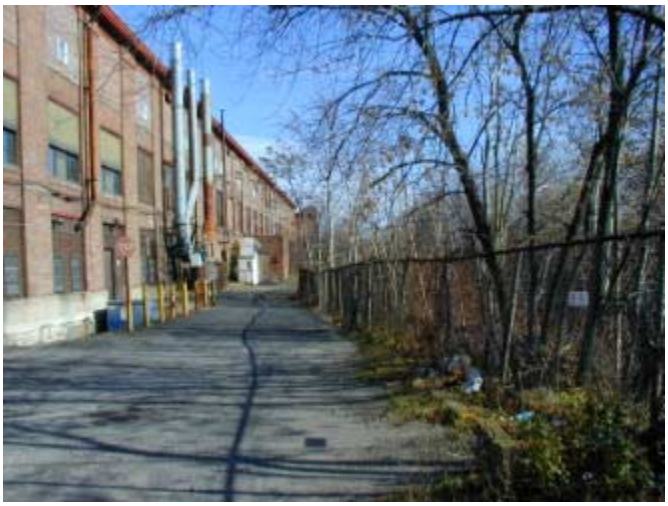
Acreage	9.50

Functional Considerations:

Water Quality	1.000
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.000
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.500



	Option #1	Option #2
Cost	NA	Very High
Benefit/Cost Ratio	NA	Very low
Risk of Failure	NA	Very high

Site #P17 ***537 Harris Ave.***
Providence (Olneyville)

Site Information: This urban lot consists of a complex of occupied industrial buildings and parking areas and is virtually all impervious surface. A very high (more than ten feet) vertical stone retaining wall that is mostly stable separates the parking from the river. A very narrow (one tree width) wooded buffer has become established on top of the retaining wall. All runoff from the impervious surfaces on this site drains directly into storm drains that discharge directly to the river without being treated by the soil/root zone of a naturally vegetated buffer. The site is bounded by the river to the west and by urban development (roads, commercial/industrial) to the north, south, and east. Exotic/invasives growing along the narrow buffer include Japanese knotweed and Norway maple. The unusually high retaining wall is a potential constraint (in terms of cost and practicality) of establishing a buffer here. In order to achieve even a moderate slope of 4:1, the soils behind the retaining wall would need to be feathered back more than 50 feet with considerable removal of fill.

Ownership	Private

Restoration Opportunities: There are no low-cost restoration opportunities. The restoration opportunity is to remove existing impervious surfaces, remove the tall retaining wall, feather back the soils behind the retaining wall (to re-establish a closer relationship between the river and the riparian buffer), add topographic complexity (to encourage infiltration, enhance habitat diversity, and accommodate and treat stormwater from the surrounding impervious surfaces), and install native buffer plantings.

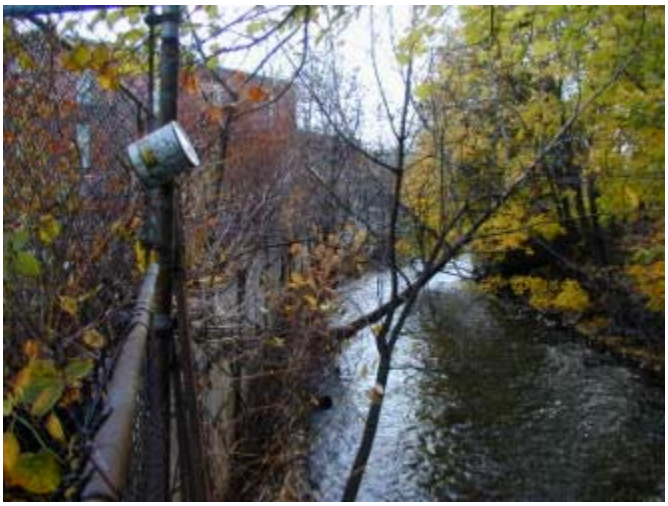
Acreage	2.00

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.500
Base Flow/Peak Flow	0.500
Education/Aesthetics	0.500

Practical Considerations:

Socioeconomic/Physical	0.500



	Option #1	Option #2
Cost	NA	Very High
Benefit/Cost Ratio	NA	Approximately even
Risk of Failure	NA	Very high

Site #P18 Stop-N-Shop (near Manton Ave. Bridge)
Providence (Manton)

Site Information: This site is located behind a Stop-N-Shop grocery store on the east bank of the River. There is a ROW (probably sewerage) that passes through the site adjacent to and paralleling the River. Immediately behind the rear parking lot, there is a relatively steep hillside of early-successional vegetation typical of disturbed sites, abandoned urban lots, and mowed meadows (grass and forbs). On this hillside, vegetation is sparse in some places, and small areas of mineral soil are exposed. Just to the north (upstream) of this hillside is a swath of recently disturbed and exposed soils along the ROW. Mature forest (both upland and wetland) occupies the area to the east of this disturbed swath. There is a narrow (1 to 2 mature tree widths, or about 10 to 15 feet) buffer strip at the immediate River bank along the entire length of the site (both at the base of the grassed hillside and between the disturbed swath and the River). Although no significant erosion and sedimentation was observed on the hillside portion, reforestation of the site would enhance several functions (particularly water quality and wildlife habitat). The exposed soils in the ROW swath to the north appear to be within the River floodplain. Hundreds of very tiny Japanese knotweed sprouts were observed in this swath of soil. It is likely that this species dominated here prior to the recent soil disturbance, and that fragments of rhizomes are present through the entire soil profile. A significant amount of trash and debris (tires, concrete, metal, and piles of cut woody vegetation) is piled in several places to either side of the ROW. Dense residential and commercial development occupies the contributing drainage area upgradient from the site, to the east.

Ownership Private

Restoration Opportunities: The restoration opportunity involves allowing the unpaved area behind the grocery store to revert to an unmanaged forested riparian buffer. Plantings would be used to jump-start the succession to forest and influence the ultimate species composition. Trash and debris removal is necessary in places. Most of the existing exotic/invasive species are shade intolerant and would ultimately be shaded out as the site became forested. However, Japanese knotweed may need to be eradicated where it forms dense patches to give woody vegetation a chance to gain a foothold. Restoration designs involving re-grading the buffer were not considered practical because it is assumed there are buried pipes associated with the ROW and the remaining area behind the back parking area is too narrow to work with considering the existing grade of the lot relative to the River.

Acreage 2.25

(continued)

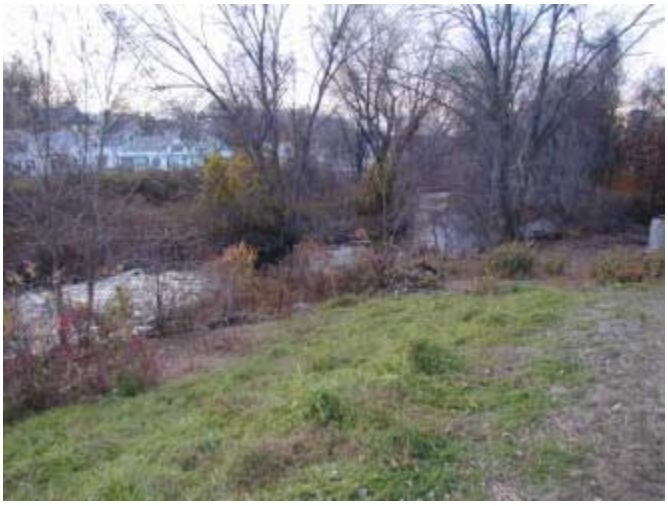
Site #P18 ***Stop-N-Shop (near Manton Ave. Bridge)*** *(continued)*
Providence (Manton)

Functional Considerations:

Water Quality	1.000
Wildlife Habitat	0.750
Base Flow/Peak Flow	0.000
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.750



	Option #1	Option #2
Cost	Low	NA
Benefit/Cost Ratio	Approximately even	NA
Risk of Failure	Very low	NA

Site #S01 Benny's Warehouse (Waterman Ave.)
Smithfield (Esmond)

Site Information: This industrial site straddles the River. The east side of the site consists of a narrow strip of land between the River and Route 104 that contains a parking lot and mowed lawns. The remaining portion of the site lies to the west of the River and contains most of the impervious surface (including all of the warehouses and structures and additional parking and access roads), but also contains some lawn area immediately adjacent to the west bank of the River. The River appears to be channelized as it flows through this site, and the portion of the site on either side of the access bridge is not adequately buffered. This River section is characterized by mostly mowed lawn down to the River edge or very narrow naturally vegetated buffers, where the woody vegetation appears to be periodically cut. Stormwater runoff from a portion of the site's impervious surfaces is piped directly to the river bank as evidenced by a series of small discharge pipes on the west bank of the River, just downstream of the access bridge. The stream bank is relatively steep in places (approximately a 2:1 slope) and is as high as several feet above the River level. The remaining portions of the site are flat with no micro-topographic complexity. The surrounding land uses include a block of mature forest immediately upstream from the site on the east bank, an extensive mature hardwood forest to the southeast of the site across Route 104, and a narrow (variable width, from 10 to 90 feet) forested riparian buffer downstream of the site. Remaining portions of the contributing watershed are commercial and moderate-density residential. The most significant contributor to overland flows and pipe discharges of stormwater runoff to this section of River and buffer is likely the roads, parking, roofs, and landscaped areas associated with the Benny's site.

Ownership Private

Restoration Opportunities: The low-cost restoration opportunity involves stopping mowing and letting mowed portions of the buffer revert to an unmanaged forested riparian buffer. Plantings could be used to jump-start the reversion to forest and to prevent a dominance of exotic/invasive species. The more intensive restoration approach would be to re-grade the buffer to enhance infiltration, accommodate stormwater runoff, and create diverse micro-habitat. The low-cost alternative (planting, but no grading) may make more sense than the high-cost alternative (stormwater management, re-grading) on the west bank because, although most of the stormwater inputs from the Benny's impervious surfaces are on the west bank, there is very little room to work with on that side of the River (*i.e.*, it is only a narrow strip of grass/vegetation between the River and actively used portions of the business). There is room to construct stormwater management features such as biofilter basins on the east bank, but the stormwater inputs on this bank may be fairly small (mostly the Benny's parking area to the northeast of the access bridge) and would need to be piped from the parking lot to the area that is now open lawn. Benny's recently expanded their parking on the east side of the River and, during the process, was cited with a wetlands violation involving the discharge of small quantities of fill and sedimentation into some narrow stream-side wetlands. Exposed soils have subsequently been stabilized. This site was identified by URI/RI DEM during a wetland restoration study (Miller and Golet, 2000) as a potential restoration area.

Acreage 1.00

Site #S01 ***Benny's Warehouse (Waterman Ave.)*** *(continued)*
Smithfield (Esmond)

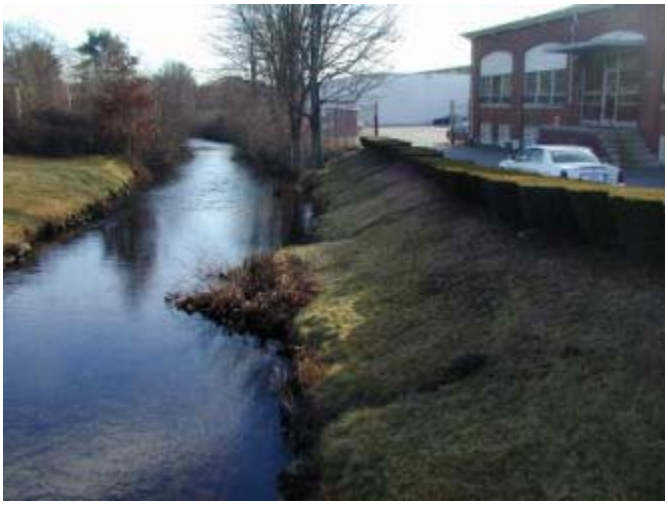
Factors making it a good restoration area were "scattered purple loosestrife" (URI site #213) and "definite fill
within an emergent marsh where vegetation and soils were recently plowed over and pushed into the adjacent marsh" (URI Site #8).

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.750
Base Flow/Peak Flow	1.000
Education/Aesthetics	1.000

Practical Considerations:

Socioeconomic/Physical	0.500



	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Approximately even	Moderately high
Risk of Failure	Very low	Moderately low

Site #S02 ***Farnum Heights (Lakeside Dr.)***
Smithfield (Georgiaville)

Site Information: This site is on a residential lot on the northwest shore of Georgiaville Pond. An eroded gully on the site accommodates stormwater runoff from a large residential development and Route 295 upgradient to the west. The resident of the property through which this drainage flows explained that Georgiaville Pond has periodically had to be dredged of accumulated sediments where this gully enters the pond. The gully bisects a managed residential shoreline use of mowed lawn with scattered trees, picnic tables, and stone walls as it flows through the property. It flows intermittently and was dry at the time of the site visit. The edge of the gully is eroded in places with exposed roots and small areas of slumping soil visible. In one section the edge of the gully is a short concrete retaining wall. The gully bed is filled with pebbles, cobbles, and stones. Concentrated stormwater runoff circumvents effective riparian buffer treatment since it rapidly flows through the buffer as surface flows and there is no opportunity for infiltration or sediment settling.

Ownership	Private

Restoration Opportunities: Construction of stormwater management measures such as a velocity dissipater and sediment basin where the stormwater pipe emerges would help alleviate the problem. Plantings within and surrounding the stormwater basin, including willow in the more erosion-prone areas, would further stabilize the area. If there is a way to lessen the quantity of stormwater runoff entering the site, this would also help to alleviate the problem. A major potential limitation of implementing such a project may be landowner objectives and implementation could involve the purchase of a drainage easement through the site.

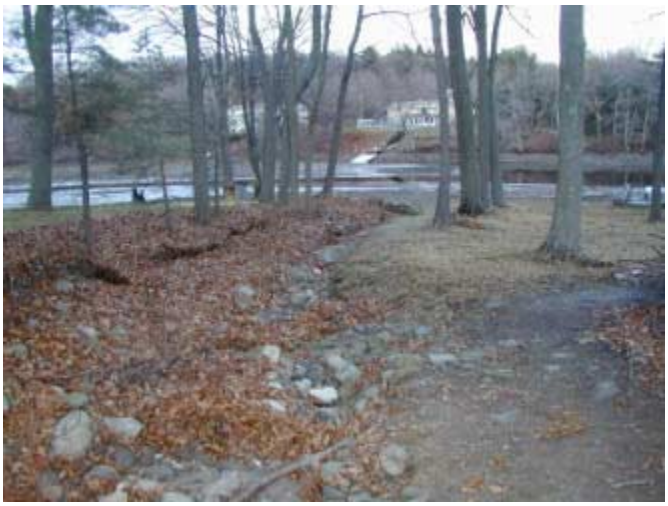
Acreage	0.25

Functional Considerations:

Water Quality	0.800
Wildlife Habitat	0.500
Base Flow/Peak Flow	1.000
Education/Aesthetics	0.250

Practical Considerations:

Socioeconomic/Physical	0.500



	Option #1	Option #2
Cost	Low	High
Benefit/Cost Ratio	Moderately low	Approximately even
Risk of Failure	Very low	Moderately low

Site #S03 Smithfield Public Works (3 Sprague ville Rd.)
Smithfield (Sprague ville)

Site Information: This site is off Sprague ville Road at the southern tip of the Stillwater Reservoir and at the northwest edge of Mountaindale Pond. The eastern portion of the public works complex is stable fill that may cover a former wetland since existing wetlands are adjacent. The site is by necessity mostly unvegetated, with more than half of the acreage consisting of impervious surfaces including pavement, roofs, and compact dirt. It is probably impractical to remove the existing fill because the area is actively used and there appears to be little extra room. However, if a narrow wooded buffer were established on and adjacent to the relatively steep edge of the fill in the eastern portion of the site, this would result in water quality and wildlife habitat enhancements. This eastern lobe of fill is immediately adjacent to a relatively high quality and extensive wetland system. This wetland system includes emergent marsh, scrub-shrub, and forested cover types that are hydrologically connected to the southwest cove of Stillwater Reservoir, Mountaindale Pond, and the Stillwater River. The steep bank that defines the edge of the lobe of fill contains Japanese knotweed and Asiatic bittersweet. Phragmites was also observed in and near the emergent marsh areas of the adjacent wetland.

Ownership Public

Restorations Opportunities: The low-cost restoration opportunity involves letting the buffer revert to an unmanaged forested riparian buffer. Plantings would be used to jump-start the succession to forest and influence the ultimate species composition. Most of the existing exotic/invasive species are shade intolerant and would ultimately be shaded out as the site became forested. Soil amendments would be necessary in places and some debris/trash would need to be removed. The more intensive restoration approach would be to remove as much of the fill as possible and re-grade the buffer. The grade should be designed to enhance storage and create diverse micro-habitat (*e.g.*, topographically complex instead of flat).

Acreage 1.75

(continued)

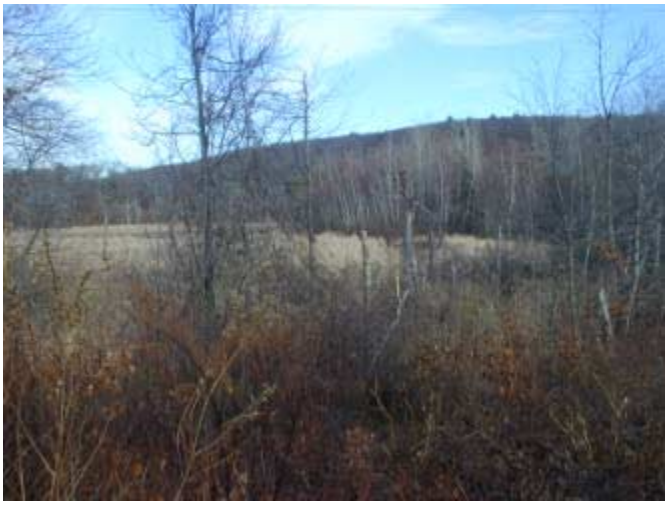
Site #S03 ***Smithfield Public Works (3 Spragueville Rd.)*** *(continued)*
Smithfield (Spragueville)

Functional Considerations:

Water Quality	0.600
Wildlife Habitat	1.000
Base Flow/Peak Flow	1.000
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.875



	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Approximately even	Moderately high
Risk of Failure	Very low	Moderately low

Site #S04 Stillwater Mill (Stillwater Rd./Thurber Ave.)
Smithfield (Stillwater)

Site Information: This is a former mill site off Stillwater Road between Capron Pond and Stillwater Pond. The existing dam is no longer used except to impound Stillwater Pond. The above-ground structures were removed in the recent past with the exception of one small portion of a building at the dam. However, large concrete slabs and sections of pavement still remain over the site's several acres. The existing condition features an early-successional community of plants typical of disturbed sites and abandoned lots. The more common exotics in the watershed such as common reed, Japanese knotweed, tree-of-heaven, and Norway maple have not gained a foothold in this community. However, Russian olive (*Elaegnus angustifolia*) is one exotic/invasive that has gained a foothold on this site. A relatively large block of mature forest including both upland and wetland habitat types borders the site to the south, across the River. As such, reforestation of the subject lot would create a significant contiguous block of riparian forest that would be large enough to provide habitat for interior bird species and other wildlife species that are sensitive to fragmentation such as many herptiles. A diverse community of native vegetation is present in the wooded areas adjacent to this site, which would help in terms of a seed source for future re-vegetation. There is a section of vertical retaining wall along a large section of the River bank below the dam, 8 feet tall or higher in places. There is a low density residential area upgradient of the site to the north and east. No signs of concentrated surface runoff such as gullies, rivulets, or eroding soils were evident on the site, and little stormwater runoff from roads or developed lots is accommodated by the site. Any runoff is able to infiltrate the soils on the site before reaching the River. The site is mostly vegetated but some areas are sparsely vegetated due to pavement, debris, or sterile (*i.e.*, low organic matter) soils.

Ownership Private

Restoration Opportunities: The low-cost restoration opportunity involves letting the buffer revert to an unmanaged forested riparian buffer. Plantings would be used to jump-start the succession to forest and influence the ultimate species composition. Most of the existing exotic/invasive species are shade intolerant and would ultimately be shaded out as the site became forested. Soil amendments would be necessary in places and some pavement and concrete slabs would need to be removed. The more intensive restoration approach would be to remove the retaining wall at the stream bank, re-grade the buffer to enhance infiltration, and create micro-habitat diversity. The bank could be feathered back in some areas to create a more natural link between the River and the buffer in association with the retaining wall being removed. For example, grading that would allow forested floodplain to develop would enhance water quality and water quantity functions associated with the riparian buffer. Biostabilization measures and, if necessary, some structural components, would be used at the immediate bank. The lack of a population center near the site limits potential benefits in education and aesthetic buffer functions that would result from a riparian buffer development project.

Acreage 6.25

(continued)

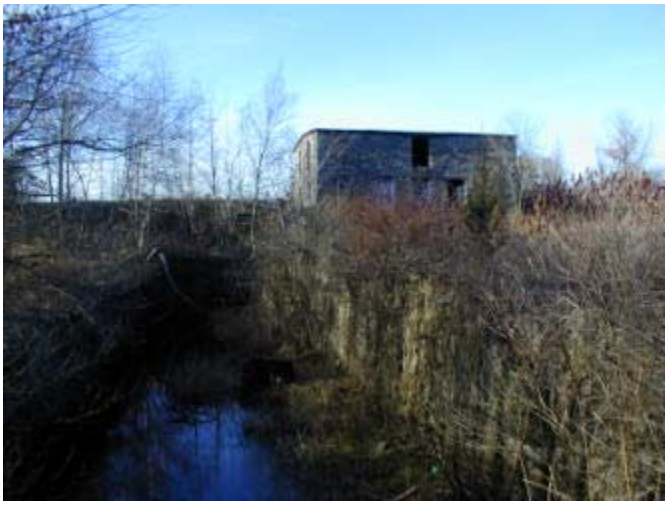
Site #S04 ***Stillwater Mill (Stillwater Rd./Thurber Ave.)*** *(continued)*
Smithfield (Stillwater)

Functional Considerations:

Water Quality	0.400
Wildlife Habitat	1.000
Base Flow/Peak Flow	1.000
Education/Aesthetics	0.500

Practical Considerations:

Socioeconomic/Physical	0.625



	Option #1	Option #2
Cost	Low	High
Benefit/Cost Ratio	Moderately low	Moderately low
Risk of Failure	Moderately low	Moderately high

Site #S05 Smith Appleby (Stillwater Rd.)
Smithfield

Site Information: This site is an historic complex run by the Smithfield Historical Society and is open to the public. It is located at the northern tip of Georgiaville Pond, immediately southeast of the intersection between Route 295 and Stillwater Road. The site contains historic buildings and associated parking and grounds. The grounds are largely mowed lawns with scattered landscape trees such as apple trees. The subject restoration opportunity involves a small stream that enters the property at Stillwater Road via a culvert and a riprap swale that empty into a small settling basin/velocity dissipater. Between the outlet of this small basin and a forested wetland at the southern edge of the property, the drainage consists of a small, straight, incised stream with mowed lawn encroaching right to the edge of it for a distance of over 200 feet. The streambank is vertical and eroding in places. Exposed live grass and tree roots are evidence that the erosion is active. The runoff entering the steam (presumably from the adjacent road and Route 295) contains elevated sediment loads. The existing settling basin somewhat mitigates this and is well designed. (This basin should be cleaned of accumulated sediments during low flow periods to maintain the storage volume). However, the stream section following it is highly degraded and as it erodes is actually a source of sediments and associated pollutants such as phosphorous. The stream subsequently flows through a forested wetland before entering Georgiaville Pond. The forested wetland is a reference condition site dominated by mature hardwood species typical of Rhode Island wooded wetlands. The stream has a high degree of ecological integrity as it flows through this forested wetland in that it is not eroding, and has a high degree of structural complexity (*e.g.*, boulders, and large woody debris). There are pockets, however, where it appears that sediment has accumulated from upstream.

Ownership Public

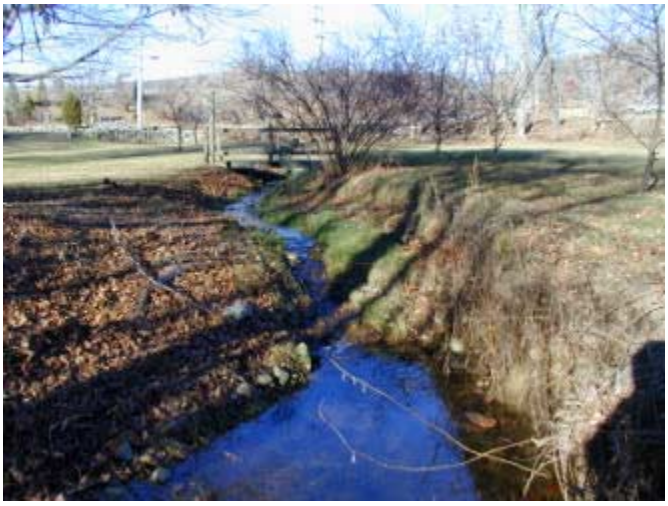
Restoration Opportunities: The low-cost restoration opportunity involves stopping mowing and letting the buffer revert to an unmanaged forested riparian buffer. Plantings would be used to jump-start the reversion to forest and to prevent a dominance of exotic/invasives. Such a forested buffer should be at least 25 feet wide, but could be wider where this would not interfere with the goals and existing uses of this public facility. Some sections, such as where the wooden bridge crosses over the stream, would remain clear. The bridge could be re-built and a path could be designed to cross the stream and buffer with practical and educational functions in mind. The more intensive restoration approach would be to create a more natural, meandering stream channel with natural (*e.g.*, gravel) substrate and small floodplain areas. The stream buffer could also be subtly re-shaped to enhance infiltration, accommodate stormwater runoff, and create diverse micro-habitat (*i.e.*, make it rolling instead of flat). Water quality and wildlife habitat functions would be greatly enhanced with these modifications. The stream bank should be less steep and better vegetated than at present, grading gradually into the buffer. Since the Historical Society has noted that views are important to them, a shrub swamp or wet meadow could be designed instead of a forested system. This would require either: 1) grading the buffer to achieve wetland hydrology with a frequency and magnitude of inundation that would preclude tree growth, or 2) annual maintenance to make sure trees do not overtake meadow and shrub species. The former is the preferred approach.

Acreage 2.25

(continued)

Site #S05 ***Smith Appleby (Stillwater Rd.)*** *(continued)*
Smithfield

Functional Considerations:



Water Quality	1.000
Wildlife Habitat	0.750
Base Flow/Peak Flow	1.000
Education/Aesthetics	0.750

Practical Considerations:

Socioeconomic/Physical	0.750

	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Approximately even	Moderately high
Risk of Failure	Very low	Moderately low

Site #S06 ***Rt. 44/W. Greenville Rd. DOT Site***
Smithfield (Greenville)

Site Information: This site is located on the traffic island formed by the intersection of West Greenville Road and Route 44, at the outlet of Waterman Reservoir, which is the beginning of the Stillwater River. The Stillwater River bisects the roughly ½-acre traffic island, and is inadequately buffered in this stretch. A large portion of the traffic island consists of exposed and compacted soils and a line of silt fence protects the river. This area is/was likely used as a staging area for road work. If alternate staging areas are available that are not immediately adjacent to a stream, pond, or wetland, it may be possible to work with the DOT to re-vegetate this site. Surrounding land uses include residential, and commercial. However, most of the immediate contributing watershed is forested, and the only stormwater runoff entering the site is from the roads that surround it.

Ownership	Public

Restoration Opportunities: The low-cost restoration opportunity involves letting the buffer revert to an unmanaged forested riparian buffer. Plantings would be used to jump-start the succession to forest and influence the ultimate species composition. Soil amendments would be necessary since the soils are severely compacted and low in organic matter. The more intensive restoration approach would be to re-grade the buffer to enhance infiltration, accommodate stormwater runoff from the adjacent roads, and create diverse micro-habitat. Route 44 is a relatively busy road so it would be visually accessible to large numbers of people. However, the site is so small that only a handful of parking places would be left available for demonstration.

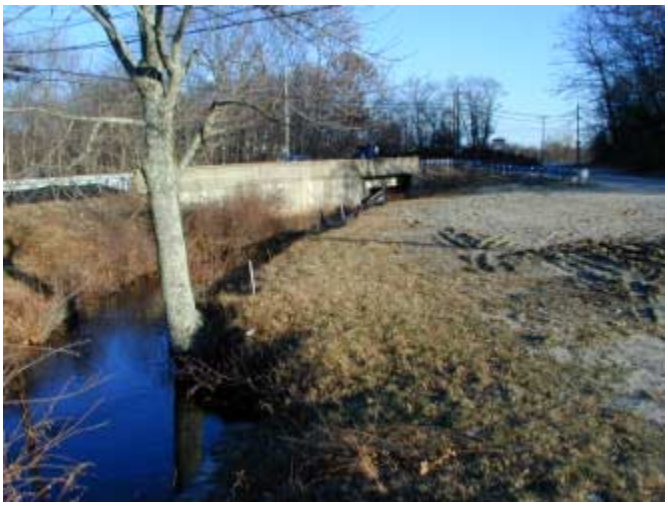
Acreage	0.25

Functional Considerations:

Water Quality	1.000
Wildlife Habitat	0.250
Base Flow/Peak Flow	1.000
Education/Aesthetics	0.500

Practical Considerations:

Socioeconomic/Physical	0.750



	Option #1	Option #2
Cost	Low	Moderate
Benefit/Cost Ratio	Approximately even	Moderately high
Risk of Failure	Very low	Moderately low